Date: February 23, 1983

Subject: Primary Metals R&D Monthly Report - February 1983

From/Location: E.L. Cambridge

To/Location: J.G. Kaufman

RAW MATERIALS & CHEMICALS RESEARCH

High Purity Alumina

Results from the twenty cycle leach tests to quantify impurity build-up in recycle liquor indicate that the sodium saturation occurs in less than 10 cycles. It will therefore be necessary to run a continuous bleed stream to maintain product purity. This was anticipated and accounted for in our capital and operating cost estimates.

A simulation of the bleed stream treatment process indicates that the level of NaCl in the process stream will be well below 16 g/l, allowing the ACH to be recycled without negatively impacting product purity.

Calcined alumina from complete and partial ATH to ACH conversion has been prepared for a fractional factorial experiment to determine grinding and ceramic properties.

AD-120 Process

A. Ore to PCACH

The long standing proposal to use jarosite precipitation to remove bleed stream impurities was tested and is not a viable alternative. Satisfactory operation, because of limited jarosite precipitation, would require complete evaporation of the entire bleed stream; thus increasing rather than reducing energy requirements.

The laboratory scale crystallizer is being re-assembled in the new laboratory area. Equipment design and procurement for the lab scale pilot plant is proceeding on plan.

B. Chlorination

New pressurized chlorination reactors have been assembled and successfully pressure tested. A quartz viewing port is on order. Most of the continuous feed system parts have been received. We expect to have a pressure reactor operating within a month.

Work has centered on approaches to eliminate CxCly in product $AlCl_3$. A 6½ hour steady state run using a CO reductant resulted in a PCB free product.

Several alternative means of reducing/eliminating chlorinated hydrocarbons are under investigation and may be categorized as follows:

1. Coke pretreatment
2. Catalytic inhibition of CxCly formation
3. Catalytic decomposition of CxCly in off-gas stream
4. Physical decomposition (microwave) of CxCly
5. Physical separation from the off-gas stream
6. Altered or controlled chlorination conditions

CxCly analysis using the HP 5710 gas chromatograph indicated an achievable lower detection limit of 5 ppm. Additional standards for all major chlorinated hydrocarbon compounds are on order. The electron capture detector for the HP 5880 gas chromatograph will be required to reduce detection capabilities to very low levels.

C. Other

Computerized project planning and documentation has now been implemented. Documents will be revised and updated monthly.

A computerized data base for all materials and experimentation has been designed.

METALS PRODUCTION

Carbon

The anode consumption test apparatus is in the final debugging stage. The airburn and CO_2 oxidation test apparatus is now operational.

Other

Several reports are in preparation, wrapping up 1982 projects that did not receive continued funding.

DEVELOPMENT & TECHNICAL SERVICES

Columbia Falls - Anode Dusting

Continued anode dusting problems at Columbia Falls resulted in a request for Sam Jones to visit and investigate several potential trouble areas. Sam will be in Columbia Falls 21-25 February.

Sebree Raw Materials Quality Control

A project definition has been prepared and accepted. Work will begin in April.

FACILITIES

Laboratory Renovation

The renovation of Labs 8 and 9 is now complete except for installation of the fume hoods. Set-up of equipment has started.

E.L. CAMBRIDGE

ELC:dg

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